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(21)Application number : **10-264871** (71)Applicant : **TOSHIBA CORP**

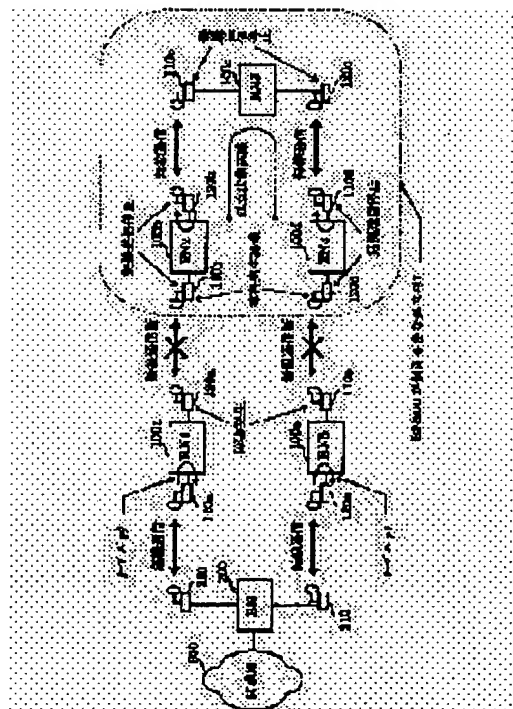
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(54) RADIO RING NETWORK SYSTEM

(57)Abstract:

PROBLEM TO BE SOLVED: To control the useless radio wave transmission of a node device inside an isolated area made uncontrollable from a base node device and to prevent radio wave interference to the surroundings.

SOLUTION: When the radio equipment 120a of the node device 100a and the radio equipment 110e of the node device 100e fail inside a network, a state where the node devices 100b, 100c and 100d are isolated from the control of



the base node device 200 is attained. In this case, the node devices 100b and 100d at the end of the isolated area recognize that an isolated state is attained by receiving a fault informing cell from the other node device during the loop- back of the present device and respectively stop the transmission operation of the radio equipment of the present device. Also, the node device 100c inside the isolated area receives the fault informing cell (for indicating that the isolated state is detected) sent out before the transmission operation stoppage from the node device 100b or the node device 100d and stops the transmission operation of the radio equipment of the present device.

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PRIOR ART

[Description of the Prior Art] Drawing 5 is drawing showing the general configuration of this kind of wireless ring type network system. In this network system, base node equipment BN (a sign 200 shows) possesses radio equipment 210 and 220, and is connected with the wide area network 300 through the wire circuit. Moreover, the ring node equipments RN1 (** and 100a show) and RN2 (it **) 100b shows -- RN3 (** and 100c show), RN4 (** and 100d show), and RN5 (** and 100e show) Respectively, radio equipment (110a, 120a), (110b, 120b), (110c, 120c), (110d, 120d), and (110e, 120e) are provided.

[0003] This network system Namely, base node equipment 200 and ring node equipment (It is only hereafter called node equipment) 100a, 100b, 100c, 100d, and 100e The radio equipment formed for each [these] node of every connects in the shape of a ring. The base node equipment 200 installed in the base of a subscriber system network (wide area network 300) It becomes the nucleus of this ring network, and the configuration which controls each node equipments 100a, 100b, 100c, 100d, and 100e concerned realizes in order to perform the communication link which went via each node equipments 100a, 100b, 100c, 100d, and 100e.

[0004] Here, the radio equipment 210,220 formed in base node equipment 200 and each node equipments 100a, 100b, 100c, and 100d, the radio equipment (110a, 120a) formed in every 100e, (110b, 120b), (110c, 120c), (110d, 120d), and (110e, 120e) can establish a bidirectional wireless circuit between the node equipment which counters, respectively.

[0005] Thereby, as this whole network, the bidirectional communication link root of the communication link root of for example, this drawing right-handed rotation and the communication link root of this drawing left-handed rotation

is formed in the ring which consists of base node equipment 200 and the node equipments 100a, 100b, 100c, 100d, and 100e. here -- the clockwise communication link root -- for example, -- present -- it is used as the communication link root of business, and the counterclockwise communication link root is used as the spare communication link root.

[0006] these -- present -- usually by having the bidirectional communication link root of business and a reserve present -- the communication link in a ring being performed using the communication link root of business, and, when the failure of a wireless communication interruption occurs in the wireless section during this communication link two node equipments contiguous to this faulty section -- both -- present -- business -- by performing the loop back for the communication link root to the preliminary communication link root, the detour communication link root can be formed and a communication link can be maintained.

[0007] During the communication link at the time of usual [above-mentioned], however, as shown in drawing 5 , when [for example,] radio equipment 110 of radio equipment 120a and node equipment 100e of node equipment 100a e breaks down, The communication link root between this base node equipment 200 is severed, and the node equipments 100b, 100c, and 100d which see from ring node equipment 200 and are in the distant place of these node equipment 100a and node equipment 100e lapse into a condition out of control with this base node equipment 200.

[0008] In this kind of conventional network system, it also sets under this situation. [in the area which became out of control from base node equipment 200, and was isolated] For example, the detour communication link root is formed by performing the loop back whom node equipment 100b in the end of this isolated area and 100d of node equipment mentioned above, respectively. In order to communicate by this detour communication link root each node equipments 100b, 100c, and 100d in isolated area It operates so that it may continue transmitting a wireless electric wave as an all seems well from the radio equipment (110b, 120b) of self-equipment, (110c, 120c), and (110d, 120d), respectively.

[0009] In this case, as a result of each node equipments 100b, 100c, and 100d in the above-mentioned isolated area continuing transmission of a wireless electric wave as it cannot perform control from base node equipment 200, the danger of giving wireless electric-wave interference to other radio equipment was high, and was not desirable on systems operation.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the amelioration for preventing interference by detailed wireless electric-wave transmission of each node equipment in the isolated area out of control from said base node equipment with respect to the wireless ring type network system which connects two or more node equipments and the base node equipment which controls each [these] node equipment in the shape of a ring through radio equipment, and changes.

[0002]

[Description of the Prior Art] Drawing 5 is drawing showing the general configuration of this kind of wireless ring type network system. In this network system, base node equipment BN (a sign 200 shows) possesses radio equipment 210 and 220, and is connected with the wide area network 300 through the wire circuit. Moreover, the ring node equipments RN1 (** and 100a show) and RN2 (it **) 100b shows -- RN3 (** and 100c show), RN4 (** and 100d show), and RN5 (** and 100e show) Respectively, radio equipment (110a, 120a), (110b, 120b), (110c, 120c), (110d, 120d), and (110e, 120e) are provided.

[0003] This network system Namely, base node equipment 200 and ring node equipment (It is only hereafter called node equipment) 100a, 100b, 100c, 100d, and 100e The radio equipment formed for each [these] node of every connects in the shape of a ring. The base node equipment 200 installed in the base of a subscriber system network (wide area network 300) It becomes the nucleus of this ring network, and the configuration which controls each node equipments 100a, 100b, 100c, 100d, and 100e concerned realizes in order to

perform the communication link which went via each node equipments 100a, 100b, 100c, 100d, and 100e.

[0004] Here, the radio equipment 210,220 formed in base node equipment 200 and each node equipments 100a, 100b, 100c, and 100d, the radio equipment (110a, 120a) formed in every 100e, (110b, 120b), (110c, 120c), (110d, 120d), and (110e, 120e) can establish a bidirectional wireless circuit between the node equipment which counters, respectively.

[0005] Thereby, as this whole network, the bidirectional communication link root of the communication link root of for example, this drawing right-handed rotation and the communication link root of this drawing left-handed rotation is formed in the ring which consists of base node equipment 200 and the node equipments 100a, 100b, 100c, 100d, and 100e. here -- the clockwise communication link root -- for example, -- present -- it is used as the communication link root of business, and the counterclockwise communication link root is used as the spare communication link root.

[0006] these -- present -- usually by having the bidirectional communication link root of business and a reserve present -- the communication link in a ring being performed using the communication link root of business, and, when the failure of a wireless communication interruption occurs in the wireless section during this communication link two node equipments contiguous to this faulty section -- both -- present -- business -- by performing the loop back for the communication link root to the preliminary communication link root, the detour communication link root can be formed and a communication link can be maintained.

[0007] During the communication link at the time of usual [above-mentioned], however, as shown in drawing 5 , when [for example,] radio equipment 110 of radio equipment 120a and node equipment 100e of node equipment 100a e breaks down, The communication link root between this base node equipment 200 is severed, and the node equipments 100b, 100c, and 100d which see from ring node equipment 200 and are in the distant place of these node equipment 100a and node equipment 100e lapse into a condition out of control with this base node equipment 200.

[0008] In this kind of conventional network system, it also sets under this situation. [in the area which became out of control from base node equipment 200, and was isolated] For example, the detour communication link root is formed by performing the loop back whom node equipment 100b in the end of this isolated area and 100d of node equipment mentioned above, respectively. In order to communicate by this detour communication link root each node

equipments 100b, 100c, and 100d in isolated area It operates so that it may continue transmitting a wireless electric wave as an all seems well from the radio equipment (110b, 120b) of self-equipment, (110c, 120c), and (110d, 120d), respectively.

[0009] In this case, as a result of each node equipments 100b, 100c, and 100d in the above-mentioned isolated area continuing transmission of a wireless electric wave as it cannot perform control from base node equipment 200, the danger of giving wireless electric-wave interference to other radio equipment was high, and was not desirable on systems operation.

[0010]

[Problem(s) to be Solved by the Invention] thus, in the above-mentioned conventional wireless ring type network system Since each node equipment in this isolated area was the configuration which continues transmission of the wireless electric wave from radio equipment as an all seems well also when the communication link root with base node equipment was severed and isolated area out of control arose from this base node equipment, As a result of continuing transmission of a wireless electric wave as each node equipment in the above-mentioned isolated area cannot perform control from base node equipment, there was a trouble that the danger of giving wireless electric-wave interference to other radio equipment was high.

[0011] This invention cancels the above-mentioned trouble, and regulates unnecessary wireless electric-wave transmission of the node equipment in the isolated area which became out of control from base node equipment, and it aims at offering the wireless ring type network system which can prevent the wireless electric-wave interference to other radio equipment.

[0012]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, invention of claim 1 In the wireless ring type network system which connects two or more node equipments and the base node equipment which controls each [these] node equipment in the shape of a ring through radio equipment, and changes It is characterized by providing a detection means to detect that said node equipment changed into the condition of having been isolated from under control of said base node equipment, and the send-action control means which stops the send action of the radio equipment of self-equipment by detecting having changed into said isolated condition with said detection means.

[0013] Invention of claim 2 is set to invention of claim 1. Node equipment The loop back control means which acts to the near opposite side which

became this wireless communication interruption when the failure used as a wireless communication interruption occurred between the node equipment which counters as the loop back of the communication link root, A notice means of a failure to send out the notice information of a failure which shows having become said wireless communication interruption through said communication link root is provided. Said detection means It is characterized by detecting that self-equipment changed into said isolated condition by receiving said notice information of a failure from other node equipments in the loop back.

[0014] Invention of claim 3 is set to invention of claim 2. Node equipment Before stopping the send action of said radio equipment, a notice means of condition detection information to send out the condition detection information which shows the purport which changed into said isolated condition is provided. Said detection means It is characterized by detecting that self-equipment changed into said isolated condition by receiving said condition detection information from other node equipments in the non-loop back.

[0015]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained to a detail with reference to an accompanying drawing. Drawing 1 is drawing showing the example of a setting of the communication link root of forward always in the wireless ring type network system concerning this invention. In this network system, the same sign is given to the conventionally same part as a system in drawing 5 .

[0016] The base node equipment 200 connected to a wide area network 300 and two or more ring node equipments 100a, 100b, 100c, 100d, and 100e connect this network system in the shape of a ring by the wireless circuit established by these base node equipment 200 and each node equipments 100a, 100b, 100c, and 100d, and the radio equipment formed in every 100e, and it is constituted, and is a thing, and that basic configuration is the same as that of a system conventionally [above-mentioned].

[0017] The radio equipment formed in base node equipment 200 and each node equipments 100a, 100b, 100c, 100d, and 100e can establish a wireless circuit bidirectional between the node equipment which counters, respectively.

[0018] thereby -- this network system -- for example, this drawing right-handed rotation -- present -- it will have the bidirectional communication link root which changes by the communication link root of business, and the

communication link root of the reserve of this drawing left-handed rotation. [0019] the communication link of forward always as shown in drawing 1 -- setting -- the above -- present -- on the communication link root of business, the data from base node equipment 200 are transmitted to order called the node equipments 100a, 100b, 100c, 100d, and 100e. order called the node equipments 100e, 100d, 100c, 100b, and 100a in the communication link root top of the reserve of this drawing left-handed rotation at this time -- present -- business -- the same data as the root or empty data is transmitted.

[0020] here -- the above -- present -- in order to make easy to understand the communication link root of business, and the spare communication link root, the configuration of the radio equipment formed in the node equipment and this equipment concerning this system is explained.

[0021] Drawing 2 is drawing for explaining the configuration of the node equipment 100 used for the network system concerning this invention. the radio equipment 110,120 formed in ring node equipment 100 (100a, 100b, 100c, 100d, 100e) and each [these] node equipment -- [(110a, 120a) -- (-- 110 -- b -- 120 -- b --) -- (-- 110 -- c -- 120 -- c --) -- (-- 110 -- d -- 120 -- d --) (110e, 120e) --] -- from -- constituting -- having -- **** .

[0022] In this system, although the example for which ATM (Asynchronous Transfer Mode: Asynchronous Transfer Mode) transmission equipment is used is explained as ring node equipment 100, you may be equipment which is not restricted to this but transmits the signal of a synchronous transfer mode (STM).

[0023] The ATM transmission equipment 100 possesses the circuit interface (I/F) section 101 (101-1,101-2,101-3,101-4), the ATM switch section 102, the cel decomposition / assembly section 103, the terminal-interface (I/F) section 104, and a control section 105, and is constituted.

[0024] The circuit interface section 101 is for sending and receiving an ATM cel between the held circuits. The ATM switch section 102 is equipped with the switching function for carrying out the exchange output of the ATM cel inputted through the circuit interface section 101 from the input port concerned to a predetermined output port.

[0025] Cel decomposition / assembly section 103 decomposes the ATM cel by which the exchange output was carried out from the ATM switch section 102, and outputs it to the local communication device 50 through the terminal-interface section 104 while it assembles the data sent from the local communication device 50 held in the terminal-interface section 104 in an ATM cel and sends them out to the ATM switch section 102.

[0026] A control section 105 performs motion control of the ATM transmission equipment 100 whole. As one of the control of this, a control section 105 performs the ATM cel message exchange which carries out routing of the input cel to the ATM switch section 102 to a suitable output port based on that cel header information with reference to the routing information memorized by the table.

[0027] moreover, the opposite side of the side which the failure which this control section 105 recognizes the failure which serves as a wireless communication interruption by receiving the detection result of the failure detection section 114,124 established in radio equipment 110 and 120, and serves as a wireless communication interruption generated -- present -- the loop back who turns up the communication link root of business on the preliminary communication link root, and connects is controlled.

[0028] Furthermore, this control section 105 will perform control which stops the send action of radio equipment 110 and 120 by stopping sending out of the output signal of the circuit interface section 101-1,101-3 of a transmitting side, if it recognizes that self-equipment changed into the condition of having been isolated from control of base node equipment 200 when the both sides of the receiving circuit 113 of radio equipment 110 and the receiving circuit 123 of radio equipment 120 changed into the condition that an input signal is unreceivable.

[0029] on the other hand -- radio equipment -- 110,120 -- respectively -- an antenna -- 111,121 -- a sending circuit -- (-- TX --) -- 112,122 -- and -- a receiving circuit -- (-- RX --) -- 113,123 -- failure detection -- the section -- 114,124 -- providing -- constituting -- having . Especially, in this invention, the sending circuit 112,122 has the function to stop transmission, when a signal is not transmitted from the circuit interface section 101-1,101-3 of the transmitting side of the ATM transmission equipment 100.

[0030] In addition, although especially illustration is not carried out, as fundamentally as the node equipment 100 and radio equipment 110,120 in drawing 2 , the same is said of the configuration of the radio equipment 210,220 connected to base node equipment 200 and this, and it can be realized, respectively.

[0031] Based on the configuration of the node equipment 100 and radio equipment 110,120 which are shown in this drawing 2 , it explains in more detail about the communication link actuation of forward always in drawing 1 .

[0032] under the communication link of forward always in drawing 1 , and

each node equipments 100a, 100b, 100c, 100d, and 100e -- present -- business -- the wireless circuit corresponding to the communication link root (for example, the direction of right-handed rotation of this drawing) and the wireless circuit corresponding to the preliminary communication link root (for example, the direction of left-handed rotation of this drawing) are established.
[0033]

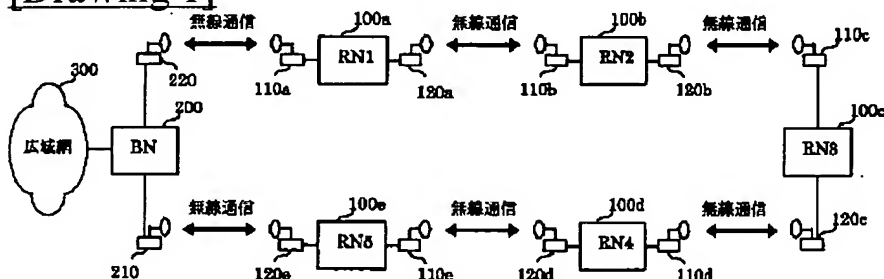
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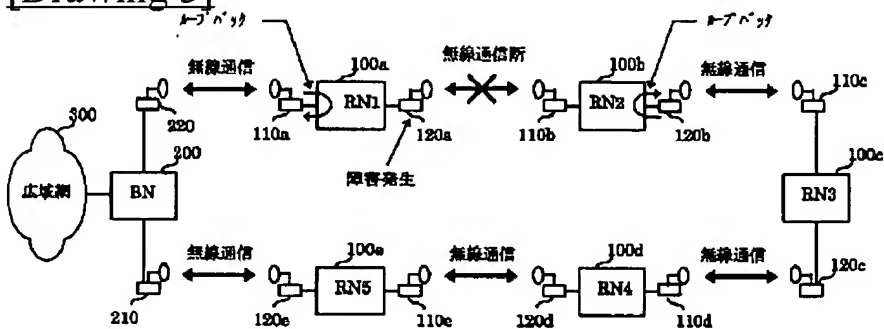
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DRAWINGS

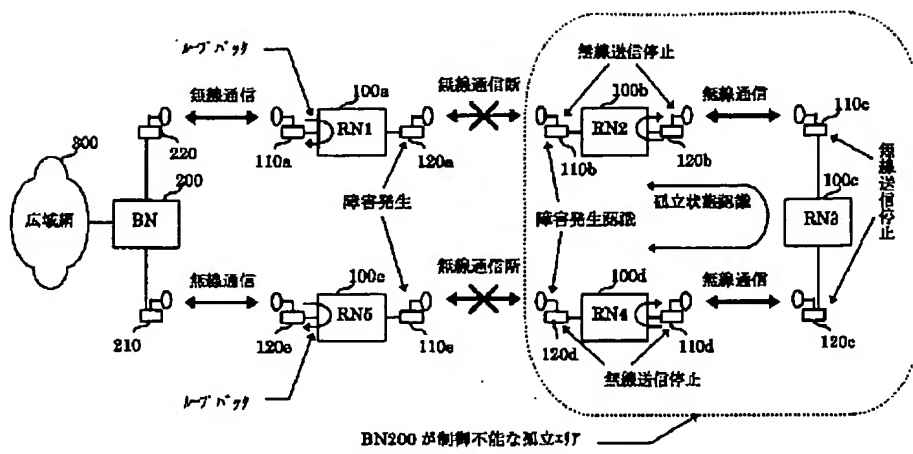
[Drawing 1]



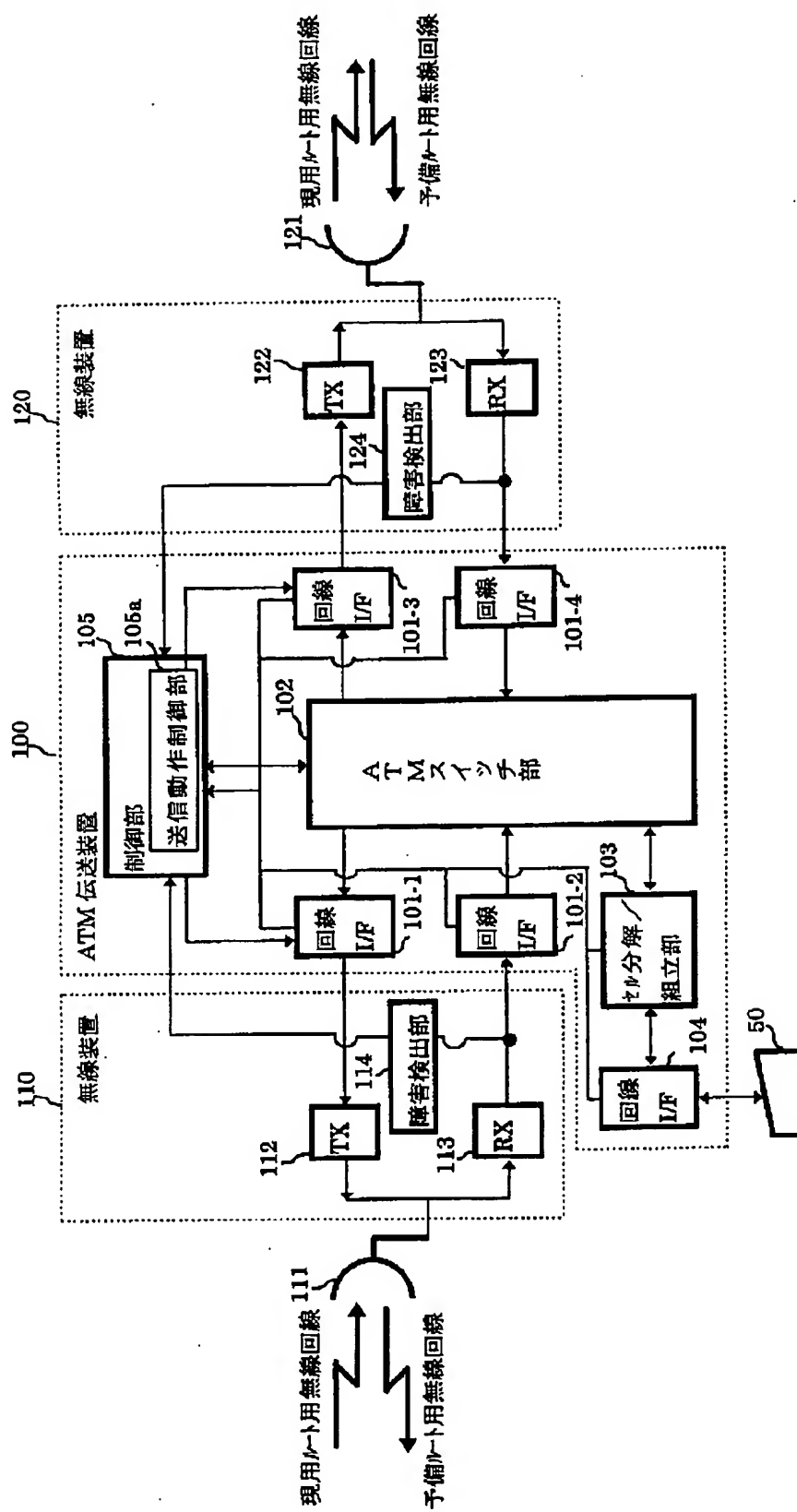
[Drawing 3]



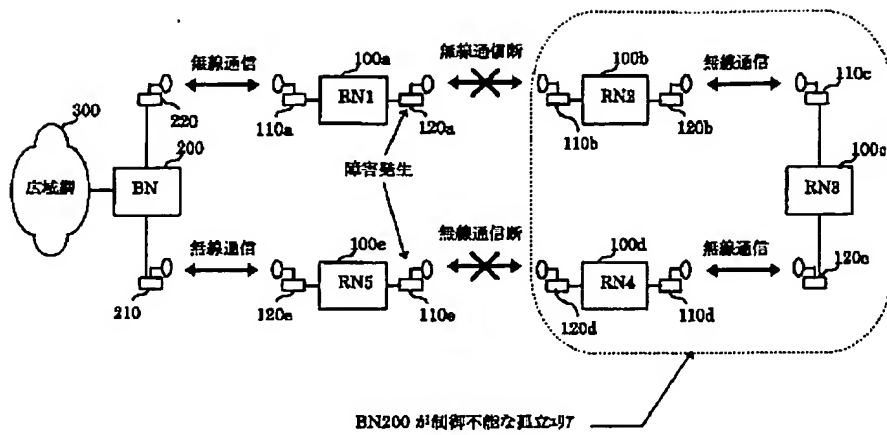
[Drawing 4]



[Drawing 2]



[Drawing 5]



[Translation done.]